Absence of Coronary Thrombosis in Navajo Indians

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• No proved case of coronary thrombosis was present among 10,267 admissions of full-blooded Navajos at the Navajo Medical Center in the years 1949-52. There were 125 cases of gallbladder disease in the same period.

Questioning of 100 patients elicited that the diets of many had an average or even high amount of cholesterol in them.

It was concluded that heredity is probably the most important factor in the prevention of coronary thrombosis in this select group.

WHILE MOST medical investigations deal with the presence of a disease, the present study deals with the absence of one—namely, coronary thrombosis.

In the course of a year of practicing medicine on the Navajo Indian Reservation in Arizona, where about 70,000 Navajo Indians live, the author noted that none of the patients he examined complained of typical anginal pain. Patients had pain in the chest from other causes but not from coronary artery disease.

The hospital records at the Navajo Medical Center, a general hospital, were reviewed for the years 1949-52, inclusive, and it was found that there were only five cases in which a diagnosis of coronary heart disease was made in a full-blooded Navajo. During that period there were 10,267 admissions of Navajos to this hospital. In none of the five cases of supposed coronary thrombosis (in which all the patients died) was autopsy done and in none was there electrocardiographic evidence of coronary disease. The diagnosis was made clinically only. Two of the patients, one 72 years of age and the other 80, died within 24 hours after admission, and coronary thrombosis was suspected but not proved. One other patient had syphilis and syphilitic heart disease. Two other patients died suddenly, and coronary disease was suspected. Therefore, there were no proved cases of coronary thrombosis during this four-year period and only five suspected cases among over 10,000 admissions to this general hospital. During this same period there were 60,405 out-patient visits and no case of coronary thrombosis.

Hospital records were also reviewed for the same period at St. Joseph's Hospital in Albuquerque, New Mexico, about 150 miles from the Navajo Medical Center. The number of admissions there, mostly of white persons, was 20,289, about twice the number at the Navajo Medical Center. There were, however, 146 cases of coronary thrombosis among them.

The Navajo people live to ages at which coronary artery disease develops in other persons (Table 1). Statistics from the Department of Interior show 10.4 per cent of the Navajo Indians are over 50 years of age, and 2.5 per cent over 70 years of age. The percentages of persons in the various age groups of the Navajos in general are comparable with the percentages in these age groups seen at the Medical Center.

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A good deal has been written about the role of diet, particularly as related to cholesterol and fat intake, in the genesis of atherosclerosis.

Many Navajos eat the usual American diet with an average cholesterol intake. Many of the Navajo hospital workers eat normal diets. Many of the Navajos spend their childhood and adolescent years at boarding school eating normal diets. And many tuberculous patients have been hospitalized for years and have been given normal diets with average cholesterol intake. Several thousand served in the Armed Forces and ate normal diets.

Table 2 is a compilation of answers to a diet questionnaire given to 100 full-blooded Navajo patients. (No attempt was made to determine an "average" Navajo diet.) Patients were asked at what frequency they ate certain high-cholesterol foods. Of the 100, whose ages range from 25 to 80, 63 per cent were over 40 years of age and 33 per cent were over 50 years of age.

Some investigators believe that a low caloric intake or a starvation diet will prevent coronary disease. It is almost impossible to measure the caloric intake among the Navajos except in institutions. However, a study of the heights and weights of this group, although not perfect, is a good index of caloric intake. One hundred male out-patients over 30 years of age were measured and weighed with their clothes on. The average weight was 159 pounds with a variation from 102 pounds to 275 pounds. The average height was 67.45 inches with a range from 60 to 75 inches. The average weight of 100 females over 30 was 147 pounds, and the range was from 101 to 220 pounds. The average height for females was 62 inches and the range 58 to 67 inches.

Adelsburg and Zah,[1] studying 50 persons less than 46 years of age who died of coronary artery occlu-

TABLE 1.—*Data on age and sex of Navajos admitted to Navajo Medical Center 1949-1952*

Year	Sex			Ages			
	Male	Female	Total	1-19	20-49	50 and Over	Total
1949	1,064	1,371	2,435	1,151 (47.3%)	996 (40.9%)	288 (11.8%)	2,435
1950	1,431	1,709	3,140	1,582 (50.3%)	1,159 (37.0%)	399 (12.7%)	3,140
1951	1,174	1,527	2,701	1,343 (49.7%)	1,043 (38.6%)	315 (11.5%)	2,701
1952	768	1,223	1,991	886 (44.5%)	874 (43.8%)	231 (11.7%)	1,991

sion, found a striking familial occurrence. They also believed that a hereditary disturbance of lipid metabolism may be considered a predisposing factor in the genesis of some forms of atherosclerosis.

White[7] noted that in 27 per cent of the cases of a group of young patients who had coronary thrombosis, there was a history of coronary disease in one or both parents, whereas in a control group only 14 per cent had a similar history.

The *absence* of coronary disease among the Navajos suggests a strong hereditary factor.

During the period covered by this study (1949-52) a diagnosis of cholelithiasis or cholecystitis was made in 125 patients admitted to the same hospital. Thirty-five were males and 90 females. The diagnosis was confirmed by operation in 45 cases and made clinically or roentgenographically in the remainder. It was concluded that gallbladder disease is prevalent among the Navajos.

Joslin, among others, pointed out that the association of diseases of the gallbladder and coronary disease is striking. He also concluded that an excess of fat in the diet of diabetic persons may lead to the formation of gallstones. Beon[2] in 1937 attempted to show that cholelithiasis is due to some disturbance in the lipoid-cholesterol metabolism, which may also be at fault in atherosclerosis. Many observers believe gallbladder disease may damage the myocardium and thereby initiate changes in the coronary vessels. It has been shown that a high percentage of gallstones are composed of cholesterol.

In over 1,400 necropsies Breyfogle[3] noted a positive association between gallbladder disease and coronary disease when coronary disease was the direct cause of death.

Tenant and Zimmerman[6] in 1,600 autopsies found a significant association between heart disease in general and gallbladder disease. Miller[4] in 1932 noted that coronary thrombosis occurred more frequently in the presence of gallbladder disease. Schwartz and Herman[5] noted that cardiac disease was higher in the presence of cholecystitis.

It is fairly generally accepted that there is a relationship between gallbladder disease and coronary artery disease. Yet at the Navajo Medical Center no relationship was noted between these two diseases. There was absence of coronary disease and prevalence of gallbladder disease in this select group.

It is logical to assume that persons who will seek medical care for gallbladder pain would also seek care for pain of coronary occlusion, and as only a small proportion of persons die following a first coronary occlusion, these people, if they had had pain from coronary disease, would live long enough to seek medical care.

TABLE 2.—*Frequency of ingestion of some high-cholesterol foods by Navajos (as determined by questioning 100 patients in hospital)*

Food	Twice a Day or More	Daily or More	At Least Twice Per Week
Meat	20%	45%	66%
Lard	39%	76%	84%
Eggs	1%	17%	41%
Butter	2%	11%	21%
Milk	9%	32%	41%

Why do full-blooded Navajo Indians not have coronary disease? No definite answer can be given to this question. One would expect to see some coronary occlusion among so large a group of people if heredity were not an important factor. It is known that some animals can on any diet keep cholesterol levels down. No one has shown a direct relationship between cholesterol and atherosclerosis, and hypercholesteremia is not essential for the development of atherosclerosis in man.

From this study one can possibly feel that a constitutional or hereditary predisposition must be present for the formation of atherosclerotic disease —that the individual must be susceptible. The Navajo, it may be conjectured, is not susceptible, can eat anything and can live any way he wishes, and will not get coronary artery disease.

Navajos almost never become bald. They have practically no hair on the chest or the sides of the face. They are different outwardly, probably because of heredity, and probably are also different inwardly.

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REFERENCES

1. Adelsburg and Zah: J. Am. Heart Assn., 3:473-75, Sept. 1950.

2. Beon, W. B.: Infarction of the heart, Am. Heart. J., 14:684-702, Dec. 1937.

3. Breyfogle, H. S.: J.A.M.A., 15:1434-37, April 13, 1940.

4. Miller, C. H.: Gallbladder and cardiac pain, Lancet, 1:767-772.

5. Schwartz, M., and Herman, A.: Association of cholecystitis with cardiac affectations, Ann. Int. Med., 4:783-794, Jan. 1931.

6. Tenant, R. Jr., and Zimmerman, H. M.: Association between diseases in the gallbladder and in the heart as evidenced at autopsy, Yale J. Biol. and Med., 3:495-503, July 1931.

7. White, P.: U. S. Armed Forces M. J., March 1951, No. 3.